Hungry for Money

On the Fungibility of Financial and Caloric Resources

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ABSTRACT

This paper attempts to provide an evolutionary explanation for humans' motivation to strive for money in present-day societies. We propose that people's desire for money is an adaptation of their desire for food. In three studies we show that feelings of financial and caloric scarcity are fungible. In Study 1, hungry participants were less likely to donate to charity than satiated participants. In Study 2, an olfactory food cue, known to increase the desire to eat, made participants offer less money in a "give some game" compared to participants in a room free of scent. In Study 3, the respondents' desire for money affected the amount of M&Ms® eaten in a subsequent taste test, but only for dietary-unrestrained participants.

INTRODUCTION

One of the strongest motivations for people living in modern societies is the desire to obtain money. The cultural dominance of money is striking: it is adopted irresistibly by any human society that encounters it (Lea & Webley, 2005). Notwithstanding the extraordinary and reinforcing power of money, for most of mankind's history, "resources" have connoted food rather than money (Diamond, 1997). Collecting or producing enough food to survive has always been man's main challenge. It seems reasonable then to consider a biological basis for our attraction to money.

LITERATURE OVERVIEW

In recent literature we come across parallels between research about money and about food. In a recent review article, Lea and Webley (2005) compared two

general models about how people deal with money. *Tool* theory sees money as a means to obtain biologically relevant incentives. Conversely, *drug* theory suggests that money has intrinsic value beyond its value as a tool. For example, Bruner and Goodman (1947) found that children overestimate the size of coins relative to other stimuli. People's value of money apparently interferes with their normal perceptual or cognitive processing of it. Also, social rules restricting money use, like in the context of gift giving (Pieters & Robben, 1999), demonstrate that money is more than just a tool.

A similar point has been made for food. Theories about hunger and eating have long been dominated by the *set-point* theory (Pinel, Assanand, & Lehman, 2000). It states that food consumption serves to prevent the body's energy resources to fall below an energy set-point. Conversely, *positive-incentive* theory (e.g. Bolles, 1990; Toates, 1981) suggests that food has value beyond its instrumentality. People are drawn to eat by the anticipated pleasure of eating, like anticipated taste. An adaptive food consumption system must anticipate and prevent energy deficits rather than react to them (Pinel et al., 2000). Compared to the set-point theory, positive-incentive theory can better account for the current problem of overconsumption (Pinel et al., 2000) that exists in many countries.

The tool theory of money and the set-point assumption of food have in common that they both look upon money or food as giving access to functional biological incentives; they are used instrumentally. The drug theory and positive-incentive theory of food, on the other hand, propose that money and food have value beyond their instrumentality. In that sense, their incentive power does not only depend on their instrumentality but also on the accompanying physiological states.

There is more empirical evidence with respect to the fungibility of financial and caloric resources than the above-described theoretical parallel. Nelson and Morrison (2005) found that men who either feel poor or hungry prefer heavier women than men who feel rich or satiated. The authors suggest that preference for women's body weight is determined by people's individual experience of resource scarcity. This is consistent with the finding that in cultures with scarce resources, heavier women are preferred to slim women (e.g. Pettijohn & Jungeberg, 2004; Symons, 1979). The fact that men's financial and caloric scarcity are both related to perceived ideal female body weight raises the question whether feelings of financial and caloric scarcity are fungible. If so, people would be less likely to sacrifice money when lacking food and vice versa. We conducted three studies to address this question.

STUDY 1

Study 1 aimed to show that hunger affects donation behavior. We manipulated hunger and measured whether and how much participants would donate. If food and money are fungible, hungry participants should donate less than satiated participants.

Method

Eighty-eight undergraduates participated in exchange for course credit. They had been asked not to eat within four hours before the study and not to drink anything but tea, coffee or water. Eighteen participants admitting that they had not complied were excluded. The remaining participants received a donation scenario and a taste test. Both are described below. In the hunger condition, the donation scenario preceded the taste test. In the satiated condition, the order was reversed.

The alleged aim of the donation scenario study was to collect information about the most suitable charity for the annual marketing department donation drive. Participants had to imagine being approached for a donation after taking part in an

experiment. The scenario was repeated ten times, using ten different charities. During the taste test, participants had to eat a big piece of cake. They then answered twenty questions with reference to the taste of the cake. Subsequently, they received filler tasks to allow the sensation of abstinence to fade, which takes about 20 minutes (Guyton, 1971).

Results

After removing four outliers, a logistic regression with the *proportion* of 'yes'-responses as the criterion and experimental condition as the predictor, revealed that the hungry participants were less likely to donate compared to the satiated participants, $M_{\text{hungry}} = 0.36$, $M_{\text{satiated}} = 0.44$; LR $\chi^2(1) = 4.64$, $p = .03$, log(OR) = .35. That is, hunger makes people to hold on to their money.

STUDY 2

One could argue that the effect in Study 1 is due to reciprocity: Satiated participants may have felt obligated to return something for the cake. To rule out this alternative explanation, we manipulated the desire to eat food by means of an olfactory food cue in Study 2. Participants had to play a "give some game" in a room that was or was not scented with the scent of freshly baked brownies. Exposure to an olfactory food cue is known to increase craving, liking, and the desire to eat the cued food (e.g., Federoff, Polivy, & Herman, 1997, 2003; Lambert & Neal, 1992).

Method

Fifty-eight undergraduates participated for course credit. All participants had eaten less than four hours before the experiment. Time since last meal was recorded to control for non-experimental variation in hunger. In the scent condition ($n = 32$), the scent of baking brownies wafted into the laboratory when participants entered. In

the control condition, no scent was present in the lab (n = 26). The scent manipulation was counterbalanced with time of the day.

Next, participants played a computerized "give some game". We allowed sufficient time for the scent to affect participants, but not to habituate them to the scent (e.g., Morrin & Ratneshwar, 2003). Participants were allocated 10 coins, which they could either keep or donate to their opponent, who would simultaneously make the same decision. Each coin kept was added to the participant's account; each coin donated was doubled by the experimenter and added to the opponent's account. To make the procedure consequential, the experimenter announced that five randomly selected participants would actually be paid according to the outcome of the game. Every coin equaled €1.

Results

We conducted an ANOVA with the number of coins donated as the dependent variable, experimental condition as the independent variable and time-since-last-meal as a control variable (4 levels). Participants in the scent condition gave on average fewer coins to their opponent compared to participants in the control condition, M_{scent} = 3.1, $M_{control}$ = 4.4; $F(1, 53) = 4.8$, $p = .033$, $\eta_p^2 = .083$. There was no effect of the time-since-last-meal, $F(3, 53) = 1.6$, n.s.

STUDY 3

Studies 1 and 2 suggest that perceiving the need for food makes people more likely to hold on to their money. In Study 3, we tested the inverse relationship. We manipulated participant's "desire for money" by inducing lottery-winning fantasies. If financial and caloric resources are fungible, an increased "desire for money" should increase the amount of food eaten in a subsequent taste test. We further expect that food restriction goals will attenuate this effect. Additionally, because bad mood

enhances food consumption (e.g., Christensen & Pettijohn, 2001; Macht & Simons, 2000) we also measured mood to rule out that any effect would be merely due to mood differences.

Method

Sixty-two undergraduates participated for an endowment of €7. Half the respondents had to imagine winning €25 000 on the lottery (high-desire-for-money condition) whereas the other half had to imagine winning €25 (low-desire-for-money condition). All participants were instructed to make a list of all things they would dream of buying if they would win the specified amount.

We pretested this lottery manipulation relying on Bruner and Goodman's finding (1947) that the value of money interferes with normal perceptual processing. Since people with a high desire for money (e.g. poor children) overestimate the size of coins relatively to people with a low(er) desire for money (e.g. rich children), we hypothesized that participants in the €25000-condition would overestimate the size of euro coins relatively to participants in the €25-condition. Participants were assigned to either the high-desire-for-money condition or the low-desire-for-money condition. After listing what they would buy, all participants had to identify, for five coins, the actual coin size among a set of seven coin sizes (ranging from 92.5% to 107.5% of the actual size). The five coins used were €0.10, €0.20, €0.50, €1, and €2. A *t*-test indicated that the average estimated size of the coins was larger in the high-desire-for-money condition than in the low-desire-for-money condition, $M_{\text{high-desire}} = 3.50$, $M_{\text{low-desire}} = 2.99$, $t(36) = 2.04$, $p = .049$, $\eta_p^2 = .10$.

In the actual experiment, after the lottery scenario, participants' mood was measured using the PANAS (Watson, Clark, & Tellegen, 1988). Subsequently, participants were instructed to complete the taste test. They were given two bowls of

the same volume, one with regular M&Ms (400 grams), and the other with the 'new' crispy M&Ms (300 grams). They were told that they were participating in a comparative taste test of M&Ms. They were allowed to eat as many M&Ms as necessary to evaluate them on several dimensions (e.g. 'are they crunchy?'). Unknown to the participants, the experimenter weighed how many M&Ms had been consumed. Participants then received the "Dutch questionnaire of Eating Behavior", developed and validated by van Strien, Frijters, Bergers, and Defares (1986). The questionnaire measures to what extent people restrain their food intake in order to loose, or not to gain, weight and allows to classify respondents as dietary restrained or unrestrained. Participants are classified as restrained when their score on the restraint scale exceeds 2.8 (i.e. the median) ($n = 26$).

Results

An ANOVA with desire-for-money and restraint as the independent variables and the time since participants' last meal and gender as control variables, revealed a significant main effect of desire-for-money, $F(1, 56) = 7.07$, $p = .01$, $\eta_p^2 = .11$. However, the main effect was qualified by an interaction with restraint, $F(1, 56) = 3.98$, $p = .05$, $\eta_p^2 = .066$. A Tukey test revealed that the unrestrained respondents ate more M&Ms in the high-desire-for-money condition than the low-desire-for-money condition , $M_{\text{high-desire}} = 40$ grams, $M_{\text{low-desire}} = 29$ grams; $t(56) = 3.5$, $p < .005$, $\eta_p^2 = .18$. For the restrained respondents, our money manipulation did not affect the amount consumed, $M_{\text{high-desire}} = 26$ grams, $M_{\text{low-desire}} = 23$ grams; $t(56) < 1$, n.s. In addition, male respondents ate more than females, $F(1, 56) = 5.61$, $p = .02$, $\eta_p^2 = .091$, and consumption decreased with increasing time since the last meal, $F(1, 56) = 4.87$, $p = .03$, $\eta_p^2 = .080$. Probably respondents did not want to spoil there appetite before an upcoming meal.

The effects of "desire for money" were not mediated by mood. First of all, the "desire for money" manipulation influenced neither positive mood [$F(1, 60) < 1$, n.s.] nor negative mood [$F(1, 60) < 1$, n.s]. Second, neither positive mood [$F(1, 60) < 1$, n.s] nor negative mood [$F(1, 60) < 1$, n.s] affected the amount of M&Ms consumed.

GENERAL DISCUSSION

Three studies show that caloric and financial resources are fungible. In Study 1, hungry participants were less likely to donate to charity than satiated participants. In Study 2, an olfactory food cue, known to increase the desire to eat, made participants offer less money in a "give some game" compared to participants in a room free of scent. In Study 3, the respondents' desire for money affected the amount of M&Ms® eaten in a subsequent taste test, but only for unrestrained participants. We propose that people's desire for money relies on human's adaptation to collect food.

To our knowledge we are the first to test the psychological link between money and food empirically. According to Gurven (2002), evolutionary psychologists and economists should be careful in generalizing their findings from monetary economic games to non-market situations and in drawing conclusions about the evolutionary origins of cooperation based upon monetary lab experiments. Part of our contribution therefore exists in providing support to evolutionary psychologists' assumption that findings involving money are informative about findings involving food and vice versa.

Just like the positive-incentive theory of food (Pinel et al., 2000) seeks to clarify why people tend to consume substantially more than is optimal for good health, the drug theory on money might succeed in explaining why some people still strive for more money when they already have plenty (or sufficiently) of it. Moreover, considering our findings of Study 3 that unrestrained participants with a high desire

for money ate more in a subsequent taste test, a drug theory of "exchangeable" money and food might help us in understanding why especially poor people nowadays tend to eat too much and suffer ill health as a result. In industrialized countries such as the USA (Drewnowsky & Specter, 2004) as well as in developing countries (James, 2004), obesity is usually associated with poverty. Perhaps in present-day societies the attraction to money is so powerful that people who, relatively speaking, fail in their quest for (more) money become frustrated. Accordingly, as financial and caloric resources are exchangeable, they might tend to appease their desire for money by consuming more calories than is healthy. In line with Heatherton and Baumeister (1991) who claim that binge eating can be an escape from self-awareness, we propose that overconsumption might be the side effect of an unsatisfied quest for money in a materialistic world. Further research is needed to address these issues.

Another avenue for future research is to investigate the overlap in neurological activation due to "desire for money" on the one hand, and to "desire for food" on the other hand. So far, neurological evidence is scarce. Breiter, Aharon, Kahneman, Dale, and Shizgal (2001) found that the orbitofrontal cortex is activated by monetary rewards, whereas O'Doherty, Deichmann, Critchley, and Dolan (2002) found the orbitofrontal cortex to be activated by sweet-tasting food rewards and cues thereof. This overlap supports our findings. However, besides money gains and food intake, this overlap in neural activation might also reflect a common pathway to the processing of *all* kinds of rewards (Wilson & Daly, 2004). In fact, the orbitofrontal region is also known to respond to tactile stimuli and even euphoria-inducing drugs (Breiter et al., 2001). To come full circle, a drug theory of money and food might then represent more than a just a metaphor.

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